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DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
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COMMISSION ON WATER RESOURCE MANAGEMENT

September 19, 2012
Honolulu, Hawaii

Application for Stream Channel Alteration Permit (SCAP.3528.2)
Streambank Stabilization, Moloa'a Stream
Declaratory Ruling No. DEC-ADM12-01
Moloa'a, Kauai (TMK: (4) 4-9-014:021)

APPLICANT:

David R. Houston
432 Court Street
Reno, NV 89501

LANDOWNER:

Same.

SUMMARY OF REQUEST:

Application for Stream Channel Alteration Permit (SCAP.3528.2), to reinforce and stabilize streambank, Moloa'a Stream, Moloa'a, Kauai (TMK: (4) 4-9-014:021).

LOCATION: See Exhibits 1, 2 and 3.

BACKGROUND:

On April 18, 2012, Ronald Wagner of Honua Engineering, Hanalei, requested emergency authorization from the Commission to stabilize a section of the bank on Moloa'a Stream on behalf of the applicant. The applicant stated that the work was required because the bank cut back during the high flows generated by the March 2012 rainstorms, placing one of the piers that elevate the dwelling on the property above the base flood elevation approximately 5 ft from the stream.

On May 9, 2012, the Commission approved Honua Engineering's request and issued emergency authorization for stream bank stabilization.

On June 25, 2012, Commission staff learned that the stabilization work had not started because the project was still under review by the US Army Corps of Engineers (USACE). The USACE did not consider the project an "emergency" because Honua Engineering had previously contacted the Corps about the stabilization project and was asked to apply for a Department of the Army (DA) permit in November, 2010. For this reason, Commission staff then asked Honua Engineering to apply for a Stream Channel Alteration Permit (SCAP) in the normal manner.

On July 3, 2012 the Commission received a SCAP application from Honua Engineering on behalf of the applicant.

On August 20, 2012, Commission staff conducted a site visit, with Jessie Paahana (USACE), Emilee Stevens (USACE) and Ronald Wagner (Honua Engineering) also present. It was observed that the section of affected bank extended over a distance of approximately 170 ft, around the outside of a bend, from just beyond the upstream boundary of the applicant's property, to well beyond the downstream boundary with the neighboring property (Exhibits 4 and 5). Existing controls on the stream channel in the vicinity of the applicant's residence include the footing to the two bridges that allow access to the applicant's and neighboring properties and unpermitted hardening of the right bank downstream from both bridges. Mr. Wagner also explained to Commission staff that additional structural beams had recently been bolted to the supporting sill beams to ensure that, if the pier in question was to be removed, the home would remain intact (although some sagging would be expected to occur).

DESCRIPTION:

Moloa'a Stream is a 10.6 mile long perennial stream with tidal connection. The lower reaches of the stream, which are intermittently inundated and where the potential for flooding is high, flow through a drowned river valley (submerged by land subsidence and/or sea level rise) and terminate on the sandy barrier beach at the head of Moloa'a Bay. The stream supports endemic and indigenous species of crustaceans, fish and insects, and provide habitat for the endangered 'Alae 'ula (Hawaiian common moorhen).

In the vicinity of the applicant's property, the vertical, 5 to 6 ft high bank is composed of unconsolidated, fine-grained alluvium and interfingering sand deposits and at the time of the site visit the water in the pool adjacent to the cutbank was approximately 5 ft deep (Exhibits 4 and 5). The unconsolidated sediments overlie limestone bedrock that, in the vicinity of the property, forms a gently sloping, approximately 6 ft wide, bench with a vertical drop-off into the pool (Exhibits 4 and 5). A photograph submitted by the applicant, taken prior to the March 2012 storm event shows a heavily vegetated bankline with a vertical face (Exhibit 6).

The applicant is proposing to stabilize the approximately 70 linear feet of streambank crossing his property with approximately 200 cubic yards of 18 inch diameter boulder rip rap placed on top of a geotechnical fabric. He proposes to embed, to a depth of 1.5 times the rip rap diameter, the lowest course of boulders in the stream bed and grade successive courses to create a 45° (1:1) slope (Exhibit 7). The rip rap wall will be finished by returning the ends into the existing stream bank adjacent to the property line, over a minimum distance of 8 ft (Exhibit 8). Best management practices to be adopted include the installation of a silt fence and turbidity curtain.

Honua Engineering noted that a 'bio-engineered slope treatment' (a combination of live plant material along with inert material such as logs, rocks and geosynthetics) may better conform to the environment but asserted that it:

1. Would not provide the protection of a hard rip rap from a major storm event;
2. Would be more extensive and expensive, and take longer to install than hard rip rap;
3. Would intrude into the stream, require dredging to maintain flow capacity and impact other properties.

ANALYSIS:

Agency Review Comments:

U.S. Fish and Wildlife Service (USFWS):

The USFWS noted that although the project appears relatively small and minimal as far as the footprint of fill is concerned, it may have precedent setting potential for neighboring property owners to follow suit with additional requests to install stream bank armor.

US Army Corps of Engineers (USACE):

1. Moloa'a Stream is a perennial stream that is tidally influenced and is a water of the U.S. subject to Corps regulatory jurisdiction.

2. The Corps discourages use of hardened structures to stabilize stream banks as they can exacerbate erosion upstream/downstream of the structure, and encourages evaluation of bioengineered alternatives.
3. The Corps recommended that Honua Engineering submit a Department of the Army (DA) permit application on behalf of the applicant for the Corps to review.
4. On May 23, 2012, USACE published a public notice to solicit comments from interested parties, adjacent landowners and cooperating resource agencies. The comment period closed on June 23, 2012 and the USACE sent an advanced e-copy of a letter, dated August 16, 2012, to the applicant containing a summary of the comments they received and requesting resolution or rebuttal to the concerns raised by the comments.

University of Hawaii Environmental Center (HEC):

HEC noted that the permit application does not include stream data that would normally be used to help characterize channel hydraulics and erosional processes and evaluate design alternatives, and suggested that the applicant provide the Commission with additional detail about the trade-offs between protection, cost, construction timing, channel maintenance, and impact on other properties. The proposed rip rap hardening of one bank raises concerns about potential impacts to the opposite bank and the downstream channel that would result from post-project changes in storm event hydraulics.

Kauai County Planning Department:

1. The proposed stream bank reinforcement measures shall be constructed as represented.
2. The Emergency Permit shall be subject to review by the Planning Department.
3. The Emergency Permit shall be valid for two years from the date of issuance.
4. The Applicant shall develop Best Management Practices (BMPs) during all phases of development to minimize erosion, dust, and sedimentation impacts of the project to abutting properties.
5. The applicant is advised that if any archaeological or historical resources are discovered during ground disturbing/construction work, all work in the area shall cease immediately and DLNR Historic Preservation Division shall be contacted.
6. The applicant, its successors and assigns, shall indemnify, defend and hold the County of Kauai harmless from and against any loss, liability, claim or demand for property damage, personal injury or death arising out of any act or omission of the applicant, its successors, assigns, officers, employees, contractors and agents under this permit or relating to or connected with the granting of this Special Management Area Emergency permit. This indemnification agreement shall be submitted for approval by the Planning Department within 14 days from the date of receipt of this amended SMA (E) approval letter, and shall be recorded at the Bureau of Conveyances or Land Court prior to the start of construction of this project. A recorded copy shall be provided to the Department prior to the start of construction of this project.
7. The applicant shall discuss and resolve the comments and recommendations of the Department of Public Works-Engineering and the Army Corps of Engineers prior to the start of construction activities.

Department of Health Clean Water Branch (DOH):

DOH noted that the project is subject to Section 401 of the Clean Water Act, and the applicant must submit a 401 Water Quality Certification (WQC) application.

Department of Land and Natural Resources, Engineering Division (ED)

ED noted that the project zone is located in coastal high hazard Zone VE and that the project must comply with the rules and regulations of the National Flood Insurance Program (NFIP), presented in Title 44 of the Code of Federal Regulations.

Chapter 343 Environmental Assessment (EA) Compliance Review:

EA Triggers: In accordance with HRS §343-5 (a), the applicant's proposed action does not trigger an EA because the project is located on private land and will not use public funds.

Staff Review

Hawaii Revised Statutes, Section 174C-71(3) gives responsibility to the Commission on Water Resource Management (Commission) for protecting stream channels from alteration whenever practicable to provide for fishery, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses; and, except in the case of routine streambed and maintenance activities, §174C-71-3(A) requires persons to obtain a permit from the Commission prior to undertaking a stream channel alteration.

Comparison of the 1936 TMK map (Exhibit 2), with the applicant's June 2012 site plan (Exhibit 3), indicates that Moloa'a Stream has migrated approximately 120 ft across its floodplain in the intervening 76-year period. This progressive lateral change in channel location over time is the result of a natural process (bank erosion, caused by the interaction between the material characteristics of the stream bank, hydraulic and gravitational forces) that is integral to the maintenance of stream channel size, shape and pattern, and riparian habitat. Bank erosion is a common occurrence and is often focused on the outside of bends in streams where hydraulic processes, acting at or below the water surface, entrain unconsolidated sediment. Erosion often continues after the flood peak (highest period of flow), because gravitational mass failures often occur as the flood wanes and the saturated stream bank loses the support of water in the channel. Bank erosion is generally beneficial to stream ecology, because erosion and deposition create a range of habitats which contribute to ecological diversity.

The management of bank erosion requires comprehensive and creative tools applied in a coordinated fashion, and long-term solutions often involve more than a bank stabilization project designed to locally limit land loss at an identified erosion site by installing rip rap. This is because, as the stream adjusts to the hardened area, the locus of erosion shifts and additional bank stabilization measures are required. In extreme cases this can produce a chain reaction that necessitates the haphazard installation of successive generations of bank erosion-control infrastructures within a short reach. By contrast, well-established vegetation, which not only dissipates flow energy and increases bank stability, but also provides habitat and is one of the most effective long-term protections against stream bank erosion and channel migration.

Staff noted the following inconsistencies in the completed application:

1. The size of the rip rap is variously described as 18 inch diameter and 18 inch minimum.
2. Boulders that it is proposed be used to armor the bank on the applicant's property have already been delivered to the site (Exhibit 9). The quantity in evidence greatly exceeds the 200 cubic yards specified in the application for a Stream Channel Alteration Permit, approximately half of the boulders in evidence greatly exceed 18 inches in diameter.
3. Section A-A included in the permit application is a schematic representation that does not faithfully portray the present geometry of the stream cross-section (Exhibit 7).
4. The applicant proposes to embed, to a depth of 1.5 times the rip rap diameter, the lowest course of boulders in the stream bed, but does not explain how this will be accomplished in the presence of the bedrock shelf or exactly where in the stream bed the trench will be excavated (Exhibit 7).
5. The applicant proposes to grade successive courses to create a 45° (1:1) slope (Exhibit 7), but does not explain how it will be possible to do this without backfilling behind the proposed rip rap installation and specifies that no fill other than rip rap will be used.
6. The applicant does not explain where the excavations necessary to return the rip rap into the stream bank will be located or the amounts of materials involved (Exhibit 8).
7. The applicant's statement that the 'do nothing' option puts the existing residences (sic) at extreme risk is inconsistent with the knowledge that the home has already been strengthened to accommodate loss of the pier, and that the pier could be (if it has not already been) tied directly to the bedrock that underlies the floodplain alluvium at a depth of approximately 6 ft.

Staff raised the following concerns about the application:

1. The exclusive use of boulder rip rap makes no concession to or provision for the maintenance of riparian habitat and vegetation will be removed from the site rather than replanted.

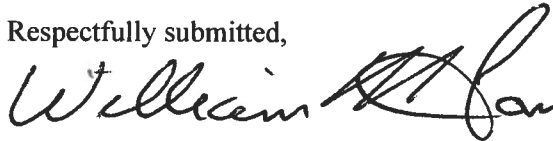
- 2) Minimal consideration was given to the use of practicable alternative, bioengineered stabilization methods.
- 3) There is a high probability that armoring the 70 ft section of stream bank crossing the applicant's property will cause the locus of erosion to shift and have a cumulative physical upstream and downstream impact on neighboring properties. This could expose ancient Hawaiian burials, human remains, *etc.*, first revealed after the floods that occurred in December, 1991, that are known to be present on the neighboring downstream property.

RECOMMENDATION:

That the Commission:

1. Declare that watercourses, such as Moloa'a Stream, which are dynamic systems in a continual state of change, require solutions that not only resolve erosion problems on an applicant's property, but also take into account the impacts to neighboring upstream and downstream portions of the stream. The proposed solution must ensure that no additional erosion problems are created to adjacent properties.
2. Declare that if the banks of a watercourse require stabilization, the proposed actions should maximize the use of natural, non-structural (bioengineered) materials, which take wildlife habitat and stream dynamics into account, and minimize the use of hard stream bank armoring, which provides no wildlife habitat and may redirect erosion problems to neighboring properties.
3. Deny the applicant's request for a Stream Channel Alteration Permit without prejudice because the applicant's proposal for stream bank stabilization does not involve the use of bio-engineered materials, and the proposed use of rip rap to harden the bank of Moloa'a Stream will most likely create adverse impacts on neighboring properties.

Respectfully submitted,



WILLIAM M. TAM
Deputy Director

Exhibits:

1. Location of project site.
2. TMK map dated October, 1936 (applicant's property is outlined in red and double-headed arrow shows distance stream has migrated in the intervening 76-yr period).
3. Site plan (residence on applicant's property is outlined in red).
4. Left bank of Moloa'a Stream, Kauai, looking upstream (9AM August 20, 2012 staff site visit), showing pier adjacent to streambank.
5. Left bank of Moloa'a Stream, Kauai, looking downstream (9AM August 20, 2012 staff site visit).
6. Moloa'a Stream crossing applicant's property prior to March 2012 storm event.
7. Cross-section of Moloa'a stream (see Exhibit 3 for location) showing proposed placement of boulder rip rap.
8. Schematic plan of rip rap end return.
9. Boulder rip rap on site (5 ft 6 inch high person for scale, 9AM August 20, 2012 staff site visit).

APPROVED FOR SUBMITTAL:



WILLIAM J. AILA, JR.
Chairperson

Exhibit 1: Location of project site.



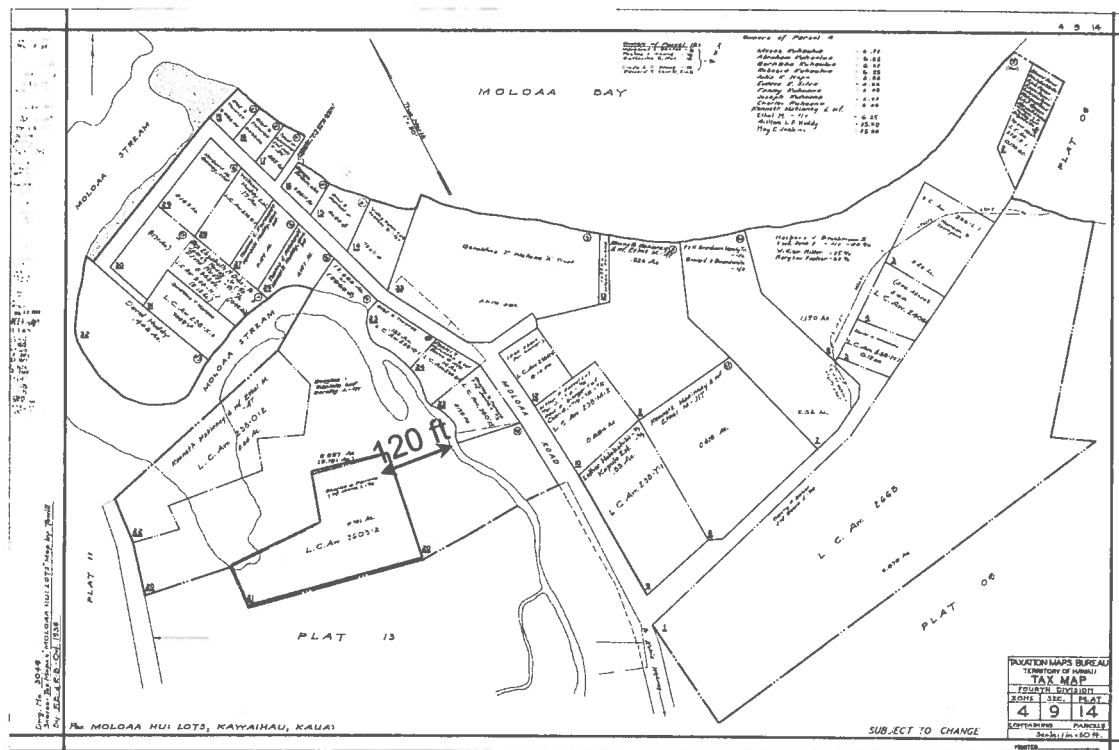
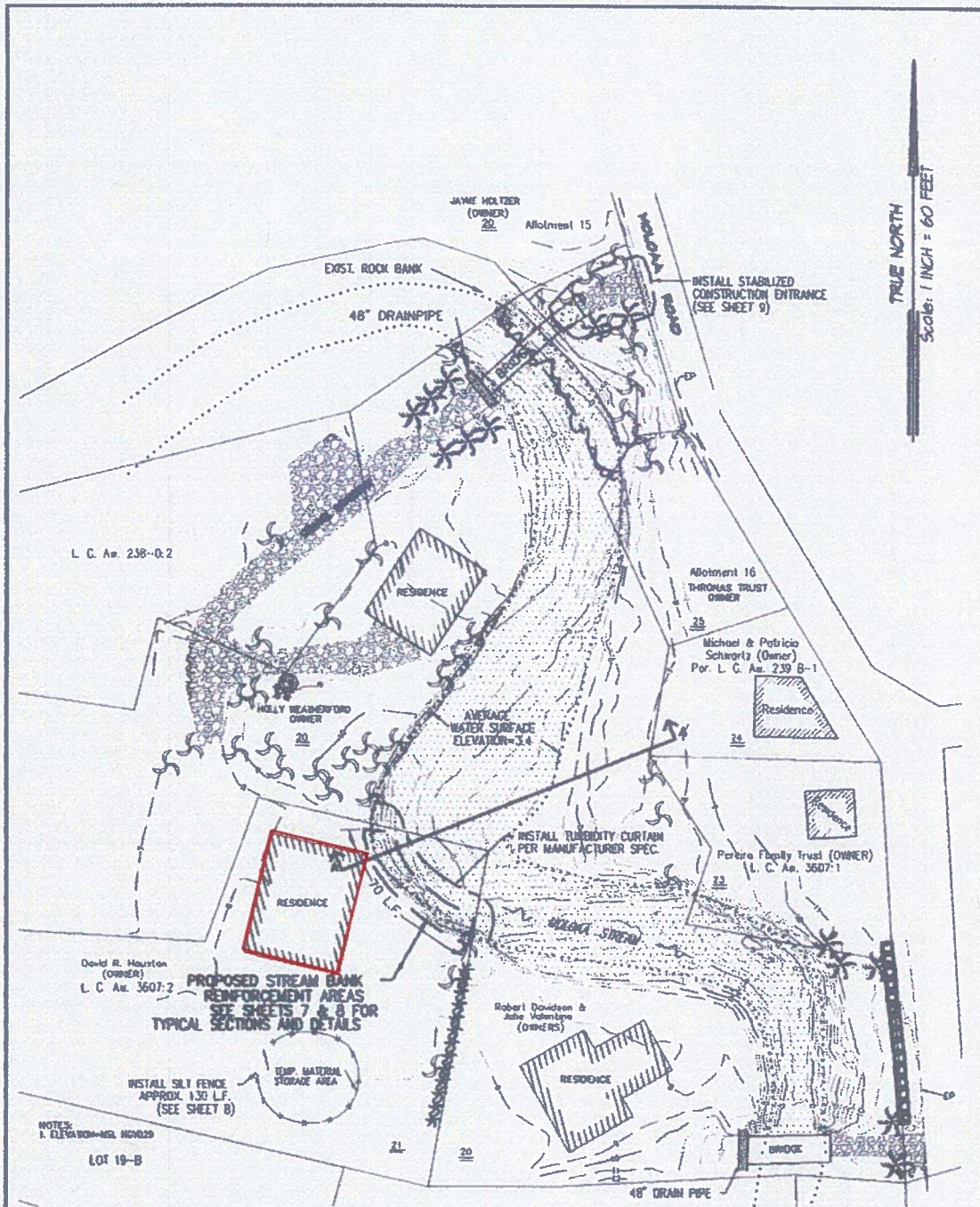


Exhibit 2: TMK map dated October, 1936 (applicant's property is outlined in red and double-headed arrow shows distance stream has migrated in the intervening 76-yr period).



TRUE NORTH
Scale: 1 INCH = 60 FEET

Exhibit 3: Site plan (residence on applicant's property is outlined in red).

<p>60 0 60</p> <p>GRAPHIC SCALE IN FEET</p>		<p>PROJECT NO. 4841</p>	
<p>Owner: David R. Houston</p>		<p>MOLOA'A STREAM BANK REINFORCEMENT</p>	
<p>SHEET TITLE: PROJECT SITE PLAN/BMP'S</p>			
<p>PURPOSE: REDUCE EROSION</p>		<p>PROPOSED: STREAM BANK STABILIZATION</p>	
<p>DATUM: MSL, NAD83</p>	<p>ADDRESS 3578 B MOLOAA ROAD MOLOAA, KAWAIIHAU, KAUAI, HAWAII</p>	<p>IN: MOLOAA RIVER</p>	
<p>ADJACENT PROPERTY OWNERS: SEE PROJECT SITE PLAN</p>	<p>TAX MAP KEY TMK (4) 4-9-14: 21</p>	<p>NEAR/AT: MOLOAA COUNTY: KAWAII STATE: HAWAII SHEET 4 OF 7 DATE: April, 2012</p>	



Exhibit 4: Left bank of Moloa`a Stream, Kauai, looking upstream (9AM August 20, 2012 staff site visit), showing pier adjacent to streambank.



Exhibit 5: Left bank of Moloa'a Stream, Kauai, looking downstream (9AM August 20, 2012 staff site visit).



PHOTOGRAPH

PRIOR TO MARCH 2012 STORM EVENT

**MOLOAA STREAM BANK REINFORCEMENT
MOLOAA, KAUAI, HAWAII
T.M.K. (4) 4-9-14**

PROJECT NO. 4841

Exhibit 6: Moloa`a Stream crossing applicant's property prior to March 2012 storm event.

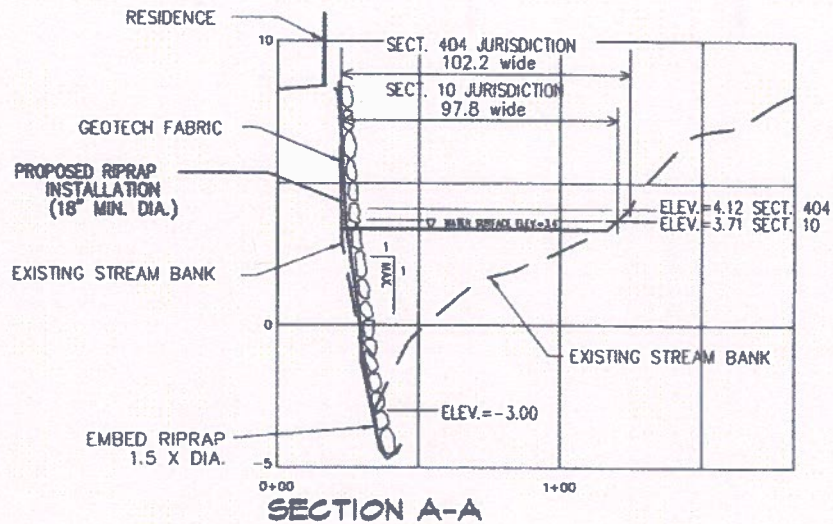


Exhibit 7: Cross-section of Moloo'a stream (see Exhibit 3 for location) showing proposed placement of boulder rip rap.

HORIZONTAL SCALE: 1"=50'
VERTICAL SCALE: 1"=5'

Owner: David R. Houston

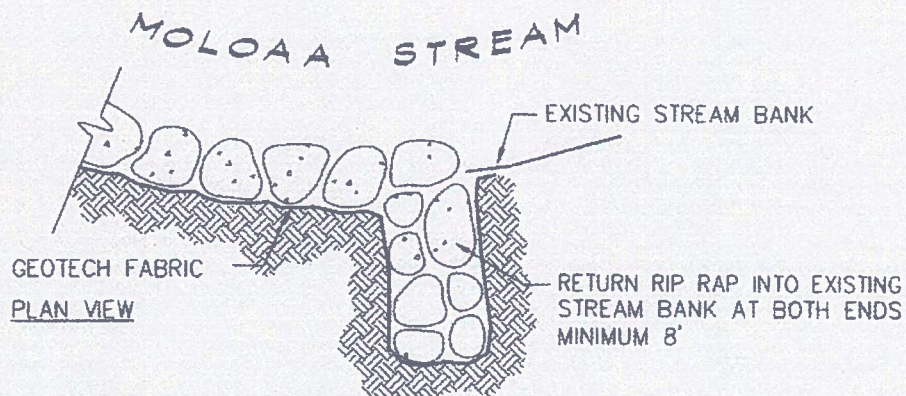
MOLOO'A STREAM BANK REINFORCEMENT

PROJECT NO. 4841

SHEET TITLE:

CROSS SECTIONS

PURPOSE: REDUCE EROSION		PROPOSED: STREAM BANK STABILIZATION
DATE: MSL, NAD83	ADDRESS 3578 B MOLOOA ROAD MOLOOA, KAWAIHAU, KAUAI, HAWAII	IN: MOLOOA RIVER
ADJACENT PROPERTY OWNERS: SEE PROJECT SITE PLAN	TAX MAP KEY TMK (4) 4-9-14: 21	NEAR/AT: MOLOOA COUNTY: KAUAI STATE: HAWAII SHEET 5 OF 7 DATE: APRIL, 2012



TYPICAL END RETURN DETAIL

N.T.S.

Exhibit 8: Schematic plan of rip rap end return.

Owner: David R. Houston		MOLOA'A STREAM BANK REINFORCEMENT		PROJECT NO. 4841	
SHEET TITLE:		DETAILS			
PURPOSE: REDUCE EROSION				PROPOSED: STREAM BANK STABILIZATION	
DATE: MSL, NAD83		ADDRESS 3578 B MOLOAA ROAD MOLOAA, KAWAIHAU, KAUAI, HAWAII		BY: MOLOAA RIVER	
ADJACENT PROPERTY OWNERS: SEE PROJECT SITE PLAN		TAX MAP KEY TMK (4) 4-9-14:21		NEAR/AT: MOLOAA COUNTY: KAUAI STATE: HAWAII SHEET 6 OF 7 DATE: APRIL 2012	



Exhibit 9: Boulder rip rap on site (5 ft 6 inch high person for scale, 9AM August 20, 2012 staff site visit).